

## Figure 7A

Codon usage for yeast (highly expressed) genes

| AmAcid | Codon | Number  | /1000 | Fraction |
|--------|-------|---------|-------|----------|
| Gly    | GGG   | 33.00   | 0.86  | 0.01     |
| Gly    | GGA   | 70.00   | 1.82  | 0.02     |
| Gly    | GGT   | 2672.00 | 69.62 | 0.91     |
| Gly    | GGC   | 171.00  | 4.46  | 0.06     |
| Glu    | GAG   | 277.00  | 7.22  | 0.10     |
| Glu    | GAA   | 2442.00 | 63.63 | 0.90     |
| Asp    | GAT   | 1100.00 | 28.66 | 0.48     |
| Asp    | GAC   | 1211.00 | 31.55 | 0.52     |
| Val    | GTG   | 117.00  | 3.05  | 0.04     |
| Val    | GTA   | 75.00   | 1.95  | 0.03     |
| Val    | GTT   | 1548.00 | 40.33 | 0.56     |
| Val    | GTC   | 1026.00 | 26.73 | 0.37     |
| Ala    | GCG   | 36.00   | 0.94  | 0.01     |
| Ala    | GCA   | 203.00  | 5.29  | 0.06     |
| Ala    | GCT   | 2221.00 | 57.87 | 0.65     |
| Ala    | GCC   | 969.00  | 25.25 | 0.28     |
| Arg    | AGG   | 20.00   | 0.52  | 0.01     |
| Arg    | AGA   | 1336.00 | 34.81 | 0.83     |
| Ser    | AGT   | 116.00  | 3.02  | 0.05     |
| Ser    | AGC   | 94.00   | 2.45  | 0.04     |
| Lys    | AAG   | 2365.00 | 61.62 | 0.78     |
| Lys    | AAA   | 651.00  | 16.96 | 0.22     |
| Asn    | AAT   | 347.00  | 9.04  | 0.22     |
| Asn    | AAC   | 1259.00 | 32.80 | 0.78     |
| Met    | ATG   | 766.00  | 19.96 | 1.00     |
| Ile    | ATA   | 43.00   | 1.12  | 0.02     |
| Ile    | ATT   | 1223.00 | 31.87 | 0.52     |
| Ile    | ATC   | 1070.00 | 27.88 | 0.46     |
| Thr    | ACG   | 28.00   | 0.73  | 0.01     |
| Thr    | ACA   | 126.00  | 3.28  | 0.06     |

**Figure 7B**

|     |     |         |       |      |
|-----|-----|---------|-------|------|
| Thr | ACT | 1129.00 | 29.42 | 0.50 |
| Thr | ACC | 962.00  | 25.07 | 0.43 |
| Trp | TGG | 325.00  | 8.47  | 1.00 |
| End | TGA | 10.00   | 0.26  | 0.09 |
| Cys | TGT | 254.00  | 6.62  | 0.89 |
| Cys | TGC | 33.00   | 0.86  | 0.11 |
| End | TAG | 11.00   | 0.29  | 0.10 |
| End | TAA | 85.00   | 2.21  | 0.80 |
| Tyr | TAT | 219.00  | 5.71  | 0.19 |
| Tyr | TAC | 913.00  | 23.79 | 0.81 |
| Leu | TTG | 2202.00 | 57.38 | 0.69 |
| Leu | TTA | 576.00  | 15.01 | 0.18 |
| Phe | TTT | 432.00  | 11.26 | 0.27 |
| Phe | TTC | 1145.00 | 29.83 | 0.73 |
| Ser | TCG | 26.00   | 0.68  | 0.01 |
| Ser | TCA | 149.00  | 3.88  | 0.06 |
| Ser | TCT | 1279.00 | 33.33 | 0.52 |
| Ser | TCC | 818.00  | 21.31 | 0.33 |
| Arg | CGG | 0.00    | 0.00  | 0.00 |
| Arg | CGA | 1.00    | 0.03  | 0.00 |
| Arg | CGT | 249.00  | 6.49  | 0.15 |
| Arg | CGC | 5.00    | 0.13  | 0.00 |
| Gln | CAG | 62.00   | 1.62  | 0.05 |
| Gln | CAA | 1225.00 | 31.92 | 0.95 |
| His | CAT | 236.00  | 6.15  | 0.35 |
| His | CAC | 433.00  | 11.28 | 0.65 |
| Leu | CTG | 52.00   | 1.35  | 0.02 |
| Leu | CTA | 236.00  | 6.15  | 0.07 |
| Leu | CTT | 90.00   | 2.35  | 0.03 |
| Leu | CTC | 14.00   | 0.36  | 0.00 |
| Pro | CCG | 10.00   | 0.26  | 0.01 |
| Pro | CCA | 1271.00 | 33.12 | 0.80 |
| Pro | CCT | 279.00  | 7.27  | 0.18 |
| Pro | CCC | 33.00   | 0.86  | 0.02 |

## ***Figure 8A***

Codon usage for *Drosophila* (highly expressed) genes

| AmAcid | Codon | Number  | /1000 | Fraction | .. |
|--------|-------|---------|-------|----------|----|
| Gly    | GGG   | 6.00    | 0.28  | 0.00     |    |
| Gly    | GGA   | 380.00  | 18.04 | 0.22     |    |
| Gly    | GGT   | 575.00  | 27.29 | 0.34     |    |
| Gly    | GGC   | 746.00  | 35.41 | 0.44     |    |
| Glu    | GAG   | 1217.00 | 57.77 | 0.91     |    |
| Glu    | GAA   | 115.00  | 5.46  | 0.09     |    |
| Asp    | GAT   | 503.00  | 23.88 | 0.43     |    |
| Asp    | GAC   | 654.00  | 31.04 | 0.57     |    |
| Val    | GTG   | 719.00  | 34.13 | 0.45     |    |
| Val    | GTA   | 29.00   | 1.38  | 0.02     |    |
| Val    | GTT   | 226.00  | 10.73 | 0.14     |    |
| Val    | GTC   | 608.00  | 28.86 | 0.38     |    |
| Ala    | GCG   | 94.00   | 4.46  | 0.05     |    |
| Ala    | GCA   | 80.00   | 3.80  | 0.04     |    |
| Ala    | GCT   | 446.00  | 21.17 | 0.24     |    |
| Ala    | GCC   | 1277.00 | 60.61 | 0.67     |    |
| Arg    | AGG   | 48.00   | 2.28  | 0.06     |    |
| Arg    | AGA   | 12.00   | 0.57  | 0.01     |    |
| Ser    | AGT   | 16.00   | 0.76  | 0.01     |    |
| Ser    | AGC   | 267.00  | 12.67 | 0.23     |    |
| Lys    | AAG   | 1360.00 | 64.55 | 0.93     |    |
| Lys    | AAA   | 108.00  | 5.13  | 0.07     |    |
| Asn    | AAT   | 127.00  | 6.03  | 0.13     |    |
| Asn    | AAC   | 878.00  | 41.67 | 0.87     |    |
| Met    | ATG   | 387.00  | 18.37 | 1.00     |    |
| Ile    | ATA   | 4.00    | 0.19  | 0.00     |    |
| Ile    | ATT   | 390.00  | 18.51 | 0.29     |    |
| Ile    | ATC   | 969.00  | 45.99 | 0.71     |    |
| Thr    | ACG   | 114.00  | 5.41  | 0.08     |    |
| Thr    | ACA   | 34.00   | 1.61  | 0.02     |    |

**Figure 8B**

|     |     |         |       |      |
|-----|-----|---------|-------|------|
| Thr | ACT | 164.00  | 7.78  | 0.11 |
| Thr | ACC | 1127.00 | 53.49 | 0.78 |
| Trp | TGG | 243.00  | 11.53 | 1.00 |
| End | TGA | 1.00    | 0.05  | 0.01 |
| Cys | TGT | 20.00   | 0.95  | 0.08 |
| Cys | TGC | 220.00  | 10.44 | 0.92 |
| End | TAG | 12.00   | 0.57  | 0.17 |
| End | TAA | 58.00   | 2.75  | 0.82 |
| Tyr | TAT | 113.00  | 5.36  | 0.16 |
| Tyr | TAC | 574.00  | 27.25 | 0.84 |
| Leu | TTG | 210.00  | 9.97  | 0.12 |
| Leu | TTA | 9.00    | 0.43  | 0.01 |
| Phe | TTT | 62.00   | 2.94  | 0.09 |
| Phe | TTC | 635.00  | 30.14 | 0.91 |
| Ser | TCG | 195.00  | 9.26  | 0.17 |
| Ser | TCA | 29.00   | 1.38  | 0.02 |
| Ser | TCT | 103.00  | 4.89  | 0.09 |
| Ser | TCC | 558.00  | 26.49 | 0.48 |
| Arg | CGG | 7.00    | 0.33  | 0.01 |
| Arg | CGA | 25.00   | 1.19  | 0.03 |
| Arg | CGT | 281.00  | 13.34 | 0.34 |
| Arg | CGC | 465.00  | 22.07 | 0.55 |
| Gln | CAG | 703.00  | 33.37 | 0.91 |
| Gln | CAA | 66.00   | 3.13  | 0.09 |
| His | CAT | 88.00   | 4.18  | 0.22 |
| His | CAC | 312.00  | 14.81 | 0.78 |
| Leu | CTG | 1182.00 | 56.10 | 0.69 |
| Leu | CTA | 21.00   | 1.00  | 0.01 |
| Leu | CTT | 55.00   | 2.61  | 0.03 |
| Leu | CTC | 224.00  | 10.63 | 0.13 |
| Pro | CCG | 84.00   | 3.99  | 0.09 |
| Pro | CCA | 135.00  | 6.41  | 0.15 |
| Pro | CCT | 72.00   | 3.42  | 0.08 |
| Pro | CCC | 626.00  | 29.71 | 0.68 |

## Figure 9A

Codon usage for enteric bacterial (highly expressed) genes 7/19/83

| AmAcid | Codon | Number | /1000 | Fraction |
|--------|-------|--------|-------|----------|
| Gly    | GGG   | 13.00  | 1.89  | 0.02     |
| Gly    | GGA   | 3.00   | 0.44  | 0.00     |
| Gly    | GGU   | 365.00 | 52.99 | 0.59     |
| Gly    | GGC   | 238.00 | 34.55 | 0.38     |
| Glu    | GAG   | 108.00 | 15.68 | 0.22     |
| Glu    | GAA   | 394.00 | 57.20 | 0.78     |
| Asp    | GAU   | 149.00 | 21.63 | 0.33     |
| Asp    | GAC   | 298.00 | 43.26 | 0.67     |
| Val    | GUG   | 93.00  | 13.50 | 0.16     |
| Val    | GUU   | 146.00 | 21.20 | 0.26     |
| Val    | GUU   | 289.00 | 41.96 | 0.51     |
| Val    | GUC   | 38.00  | 5.52  | 0.07     |
| Ala    | GCG   | 161.00 | 23.37 | 0.26     |
| Ala    | GCA   | 173.00 | 25.12 | 0.28     |
| Ala    | GCU   | 212.00 | 30.78 | 0.35     |
| Ala    | GCC   | 62.00  | 9.00  | 0.10     |
| Arg    | AGG   | 1.00   | 0.15  | 0.00     |
| Arg    | AGA   | 0.00   | 0.00  | 0.00     |
| Ser    | AGU   | 9.00   | 1.31  | 0.03     |
| Ser    | AGC   | 71.00  | 10.31 | 0.20     |
| Lys    | AAG   | 111.00 | 16.11 | 0.26     |
| Lys    | AAA   | 320.00 | 46.46 | 0.74     |
| Asn    | AAU   | 19.00  | 2.76  | 0.06     |
| Asn    | AAC   | 274.00 | 39.78 | 0.94     |
| Met    | AUG   | 170.00 | 24.68 | 1.00     |
| Ile    | AUA   | 1.00   | 0.15  | 0.00     |
| Ile    | AUU   | 70.00  | 10.16 | 0.17     |
| Ile    | AUC   | 345.00 | 50.09 | 0.83     |
| Thr    | ACG   | 25.00  | 3.63  | 0.07     |
| Thr    | ACA   | 14.00  | 2.03  | 0.04     |
| Thr    | ACU   | 130.00 | 18.87 | 0.35     |
| Thr    | ACC   | 206.00 | 29.91 | 0.55     |

**Figure 9B**

| AmAcid | Codon | Number | /1000 | Fraction |
|--------|-------|--------|-------|----------|
| Trp    | UGG   | 55.00  | 7.98  | 1.00     |
| End    | UGA   | 0.00   | 0.00  | 0.00     |
| Cys    | UGU   | 22.00  | 3.19  | 0.49     |
| Cys    | UGC   | 23.00  | 3.34  | 0.51     |
| End    | UAG   | 0.00   | 0.00  | 0.00     |
| End    | UAA   | 0.00   | 0.00  | 0.00     |
| Tyr    | UAU   | 51.00  | 7.40  | 0.25     |
| Tyr    | UAC   | 157.00 | 22.79 | 0.75     |
| Leu    | UUG   | 18.00  | 2.61  | 0.03     |
| Leu    | UUA   | 12.00  | 1.74  | 0.02     |
| Phe    | UUU   | 51.00  | 7.40  | 0.24     |
| Phe    | UUC   | 166.00 | 24.10 | 0.76     |
| Ser    | UCG   | 14.00  | 2.03  | 0.04     |
| Ser    | UCA   | 7.00   | 1.02  | 0.02     |
| Ser    | UCU   | 120.00 | 17.42 | 0.34     |
| Ser    | UCC   | 131.00 | 19.02 | 0.37     |
| Arg    | CGG   | 1.00   | 0.15  | 0.00     |
| Arg    | CGA   | 2.00   | 0.29  | 0.01     |
| Arg    | CGU   | 290.00 | 42.10 | 0.74     |
| Arg    | CGC   | 96.00  | 13.94 | 0.25     |
| Gln    | CAG   | 233.00 | 33.83 | 0.86     |
| Gln    | CAA   | 37.00  | 5.37  | 0.14     |
| His    | CAU   | 18.00  | 2.61  | 0.17     |
| His    | CAC   | 85.00  | 12.34 | 0.83     |
| Leu    | CUG   | 480.00 | 69.69 | 0.83     |
| Leu    | CUA   | 2.00   | 0.29  | 0.00     |
| Leu    | CUU   | 25.00  | 3.63  | 0.04     |
| Leu    | CUC   | 38.00  | 5.52  | 0.07     |
| Pro    | CCG   | 190.00 | 27.58 | 0.77     |
| Pro    | CCA   | 36.00  | 5.23  | 0.15     |
| Pro    | CCU   | 19.00  | 2.76  | 0.08     |
| Pro    | CCC   | 1.00   | 0.15  | 0.00     |